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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.            | CONFIRMATION NO.       |
|--|-------------|----------------------|--------------------------------|------------------------|
| 10/555,287   | 11/02/2005  | Takeshi Azami        | 8074-1103                      | 7821                   |
| 466 7590 06/25/2008<br>YOUNG & THOMPSON<br>209 Madison Street<br>Suite 500<br>ALEXANDRIA, VA 22314 |             |                      | EXAMINER<br>DANIELS, MATTHEW J |                        |
|  |             |                      | ART UNIT<br>1791               | PAPER NUMBER           |
|  |             |                      | MAIL DATE<br>06/25/2008        | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/555,287

**Applicant(s)**

AZAMI ET AL.

**Examiner**

MATTHEW J. DANIELS

**Art Unit**

1791

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 November 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SG/08)  
Paper No(s)/Mail Date 11/2/05
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. **Claim 3** is objected to because of the following informalities: the claim does not end with a period and has a "(1)" at the end of the claim. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasuya (J. Phys. Chem. B, Vol. 106, No. 19 (2002), pp. 4947-4951) in view of Iijima (Chemical Physics Letters, Vol. 309 (1999) pp. 165-170). **As to Claim 1**, Kasuya teaches a method of producing a carbon nanohorn assembly comprising:

irradiating a surface of a graphite target (paragraph bridging 4947-4948) with pulse light (*Id.*) to vaporize carbon vapor from said graphite target (*Id.*) and recovering the carbon vapor to obtain a carbon nanohorn (Figs. 2-3),

wherein a power density of said pulse light is set in a range of 5 kW/cm<sup>2</sup> or more and 25 kW/cm<sup>2</sup> or less (paragraph bridging 4947-4948), and

wherein a pulse width of said pulse light is set in a range of 0.5 seconds or more and 1.25 seconds or less (paragraph bridging 4947-4948).

Kasuya is silent to the step wherein an irradiation position of said pulse light is moved at substantially constant speed when the surface of said graphite target is irradiated with said pulse light.

However, at the time of the invention it was a known technique to provide a rotating carbon rod. For example, Iijima teaches a rotating rod (page 166), and it would have been obvious to rotate at a constant speed.

It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the method of Iijima into that of Kasuya because Kasuya expressly suggests it in pointing to endnote three as providing the experimental apparatus and technique. See the paragraph bridging pages 4947 and 4948 and endnote three of Kasuya.

**As to Claims 2 and 3**, Kasuya teaches 1 Hz (paragraph bridging 4947-4948), or 1 cycle per second, which would leave a pause width of 500 ms. In doing so, the Kasuya cycle fulfills the condition of Claim 3 because  $0.5/1 = 0.5$ . **As to Claim 4**, the target is 30 mm in diameter and travels at 6 RPM (Iijima, page 166, left column). This provides a relative motion between the pulse of light of 15.71 mm/min, or 0.262 mm/sec, within the claimed range. **As to Claims 5-7**, in the Iijima process, the graphite target is rotated about a central axis and the irradiation position is moved by axial advancement along its axis such that the angle would stay constant, but irradiation positions would not overlap due to the axial advancement (page 166, left column, first full paragraph).

***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ullmann (Nanoparticle formation by laser ablation, Journal of Nanoparticle Research, Vol. 4, (2002) pp. 499-509) is no more pertinent than the references above, but does suggest that some process variables are result effective. See Figs. 2 and 4. Kokai (Laser vaporization synthesis of polyhedral graphite, Applied Physics A, Vol. 77, (2003) pp. 69-71) teaches some pertinent aspects of the invention, but is redundant over the references above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. DANIELS whose telephone number is (571) 272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew J. Daniels/  
Primary Examiner, Art Unit 1791  
6/6/08